

Habitat stylization in urban environments from a climate change adaptation point of view

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Aim of stylization

Stylization of a habitat or landscape is a common garden and open space design method that imitates nature and evokes the scenery, often applied in urban environments. A rarely proposed aspect of stylization is that it serves as a kind of adaptation tool to climate change since the method affords the possibility of preserving the physiognomy of those habitats that will likely vanish due to future climate change (BEDE-FAZEKAS & SOMODI 2015). Stylization has garden and open space design and dendrological significance, since it is not bound to the original location of the habitat and does not aim at contributing to habitat restoration. Natural habitats provide cultural ecosystem services (ES) amongst other types of ES, since their physiognomy is valued by humans. The aim of preserving or evoking the character of those habitats that might perish in the future due to climate change is therefore well-founded. The authors refer to stylization as an essential climate change adaptation tool that landscape architects can apply in urban environments.

According to the classification of ecologically informed ornamental planning designs (DUNNETT & HITCHMOUGH 2004) stylization can be viewed as a nature-imitating plant application which evokes the scenery rather than an ecological application which assists the processes and functions observed in the nature (BEDE-FAZEKAS & SOMODI 2015).

Substitute species

In the course of stylization characteristic species of the original association are replaced by taxa with similar appearance compared to the original species (SCHMIDT 2003). Searching for a substitute species that is of similar physiognomy but is more tolerant to the predicted future climate has several alternative ways that are summarized in Table 1. The most basic and most limited approach is using the experience/knowledge of the designer or other expert (dendrologists, employees of arboreta or tree nurseries) (Method "By heart"). One can exhaustively study the species of the same genus or family of the original species (Method "Related"). Another method is searching for a plant species having a species name that refer to the original species or to one of the characteristics of the original species, using plant name databases (Method "Scientific name"). One can use a photo-based photo search method in general or specific photo databases to find species with similar morphological features (Method "Photo"). The most scientifically sophisticated approach is the search in plant trait databases for species that has visual traits similar to that of the original one.

Table 1. Methods of substitute species searching, their limitations, their type in terms of the stochasticity of the finding of substitute species, and some examples.

Method	Limitations	Stochastic/deterministic	Examples
By heart	needs much experience/knowledge	stochastic	<i>Fraxinus ornus</i> – <i>Tetradium daniellii</i>
Related	does not work in case of mono-specific genera/families	deterministic	<i>Ulmus laevis</i> – <i>Ulmus minor</i>
Scientific name	needs a descriptive species name	deterministic	<i>Castanea sativa</i> – <i>Quercus castaneifolia</i>
Photo	needs characteristic morphological features (colorful flower or special fruit)	stochastic	<i>Alnus glutinosa</i> flower – <i>Corylus columna</i> flower
Traits	needs large, searchable database with several visual plant traits recorded	deterministic	<i>Picea abies</i> – <i>Pseudotsuga menziesii</i>

Stylization of natural habitats encounters many challenges, especially in densely built and modified urban environments. Urban meso-climate and future climate change will jointly limit the assortment of ornamental plants that landscape architects can apply during stylization of climate change habitats. Since functional and visual traits of the plants are interdependent from each other, finding drought tolerant ornamental taxa which look similar to those of the evoked natural habitat is not always possible.

References

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